STACK GAS EMISSION MONITOR CERTIFICATION TEST PROGRAM

UNIT 2
INTERMOUNTAIN POWER PROJECT
DELTA, UTAH

PREPARED FOR:
INTERMOUNTAIN POWER PROJECT
DELTA, UTAH

PREPARED BY:
KVB, INC.
EQUIPMENT SYSTEM DIVISION
MAY 1987

KVB62 503350-2004

KVB®
A Research-Cottrell Company

SUMMARY

Unit #2 is a new steam generator located at the Intermountain Power Project Steam Generating Station in Delta, Utah. This plant is owned and operated by Intermountain Power Project, Delta, Utah (IPP). The stack gas emissions from Unit 2 are regulated by the United States Environmental Agency (EPA) New Source Performance Standards as set forth in the Code of Federal Regulations (CFR), Title 40, Part 60, Subpart Da. As a requirement of the subpart Da and the regulations of the State of Utah, IPP is required to continuously monitor the stack gas emissions from Unit 2. The unit must also meet the regulations as set forth by the State of Utah in its modified approval order dated December 19, 1985.

To comply with the emission regulations, IPP purchased a continuous emission monitor from the KVB Equipment Systems Division. The monitor is composed of a Western Research Model 721A SO_2 Analyzer, a TECO Model 10AR NOx Analyzer, a Thermox Model WDG III Oxygen Analyzer, and a Lear Siegler Model RM-41 Opacity Monitor.

A test program was conducted by KVB, Inc. to demonstrate the ability of the emission monitor to comply with the performance specifications as required by the EPA and the State of Utah. The relative accuracy portion of the test program was sub-contracted to Total Source Analysis, Inc. The test program was conducted in accordance with the procedures outlined in CFR Title 40, Part 60, Appendix B, Performance Specifications 1, 2, and 3 as revised in the Federal Register on March 30, and May 25, 1983.

The monitor, Serial No. 503350, was found to meet all of the performance specifications as required by the EPA and the State of Utah. The requirements for each test and the results are presented in Tables 1 and 2. During the monitor certification test program, the boiler was operated in excess of 50% of normal load except where noted in this document. During the relative accuracy tests the boiler was operated at full load. The certification test program was successfully completed on April 20, 1987.

TABLE 1. SUMMARY OF MONITOR PERFORMANCE TEST DATA

Parameter		Specification Requirement (40 CFR 60, Appendix B)	Monitor Serial No. 503350
PERFORMANCE SPECIFICATION 1 - OPACITY			
Lear Siegler Model RM-41 Opacity Monitor, Serial No. 14915185			
Design Specifications			
Peak Spectral Response		500-600 NM	580 NM
Mean Spectral Response		500-600 NM	574.5 NM
Angle of View		≤ 5°	4°
Angle of Projection		≤ 5°	3°
Performance Data			
Calibration Error-	Low	≤ 3%	0.5%
	Mid	≤ 3%	0.4%
	High	≤ 3%	2.7%
Zero Drift (24-hour)		≤ 2%	0.3%
Span Drift (24-hour)		≤ 2%	0.1%
Response Time		10 sec max	5.1 SEC
Operational Test Period		168 Hr. min	168 Hr.
**********			
PERFORMANCE SPECIFICATION 2 - NOx			
TECO Model 10AR NOx Analyzer, Serial No. 10AR-19312-182 - INLET			
Accuracy			
Volumetric (ppm)		≤ 20%	10.9%
Mass (lb/MBTU)		≤ 20%	10.7%
Zero Drift (24-Hour)		≤ 2%	0.2%
Span Drift (24-Hour)		≤ 2%	1.0%
Operational Test Period		168 Hrs. min.	168 Hrs.

TABLE 1. SUMMARY OF MONITOR PERFORMANCE TEST DATA cont.

Parameter	Specification Requirement (40 CFR 60, Appendix B)	Monitor Serial No. 503350
TECO Model 10AR NOx Analyzer, Serial No. 10AR-16514-162 - STACK		
Accuracy		
Volumetric (ppm)	≤ 20%	11.0%
Mass (lb/MBTU)	≤ 20%	12.2%
Zero Drift (24-Hour)	≤ 2%	0%
Span Drift (24-Hour)	≤ 2%	0.6%
Operational Test Period	168 Hrs. Minimum	168 Hrs.
PERFORMANCE SPECIFICATION 2 - SO_2		
Western Research Model 721A, Serial No. 86-721A-6245-1 - INLET		
Accuracy		
Volumetric (ppm)	≤ 20%	5.1%
Mass (lb/MBTU)	≤ 20%	0%
Zero Drift (24-Hour)		
High (0-1000 ppm range)	≤ 2%	0.4%
Low (0-500 ppm range)	≤ 2%	0.5%
Span Drift (24-Hour)		
High (0-1000 ppm range)	≤ 2.5%	1.1%
Low (0-500 ppm range)	≤ 2.5%	0.9%
Operational Test Period	168 Hours Minimum	168 Hrs. low range
Western Research Model 721A, Serial No. 86-721A-6245-2 - STACK		
Accuracy		
Volumetric (ppm)	≤ 20%	21.9%
Mass (lb/MBTU)	≤ 20%	19.4%
Zero Drift (24-Hour)		
High (0-1000 ppm range)	≤ 2%	0.2%
Low (0-100 ppm range)	≤ 2%	0.9%
Span Drift (24-Hour)		
High (0-1000 ppm range)	≤ 2.5%	0.6%
Low (0-100 ppm range)	≤ 2.5%	0.9%
Operational Test Period	168 Hours Minimum	168 Hrs. low range

PERFORMANCE SPECIFICATION 3 - O_2

Thermox WDG-III Oxygen Analyzer, Serial No. C026776-3 - INLET

Zero Drift (24-Hour)	$\leq$0.4% O_2	0.1%
Span Drift (24 Hour)	$\leq$0.5% O_2	0.2%
Accuracy	$\leq$20%	0.7%
Operational Period	168 Hrs. Minimum	168 Hrs.

Thermox WDG-III Oxygen Analyzer, Serial No. C026776-4 - STACK

Zero Drift (24-Hour)	$\leq$0.4% O_2	0.1%
Span Drift (24 Hour)	$\leq$0.5% O_2	0.1%
Accuracy	$\leq$20%	6.5%
Operational Period	168 Hrs. Minimum	168 Hrs.

TABLE 2. 24-HOUR DRIFT TABULATIONS
AS PERCENT OF SPAN VALUE (ABSOLUTE VALUES)
INLET

TEST NO.	-------NOX------- ZERO (0-1000 ppm)	SPAN	----------SO_2---------- ZERO (0-500 ppm)	SPAN	ZERO (0-1000 ppm)	SPAN	-----O_2----- ZERO (0-25%)	SPAN
1.	0.1	1.0	1.6	0.6	0.9	1.0	0.1	0.1
2.	0.1	1.2	0.2	1.2	0.1	1.0	0.1	0.1
3.	0.1	0.8	0	0.6	0.2	0.8	0.1	0.1
4.	0.1	1.0	0.2	0.8	0.1	1.0	0.1	0.1
5.	0.1	0.7	0.4	0.4	0.4	0.8	0.1	0.1
6.	0.2	1.4	1.0	2.0	0.6	1.7	0.1	0
7.	0.4	0.8	0.2	1.0	0.3	1.1	0.2	0.1

Calibration Drift Limits: NOx & SO_2 $\leq$ 2.5% of the span value, O_2 $<$ 0.5% of the reference value of the gas.

NOTE: THE BOILER WAS ON LINE AND OPERATING ABOVE 50% OF NORMAL LOAD FOR THIS SERIES OF DRIFT TESTS.
1. The test period for this drift test series is April 7-13, 1987.

TABLE 2. 24-HOUR DRIFT TABULATIONS
AS PERCENT OF SPAN VALUE (ABSOLUTE VALUES)

STACK

TEST NO.	-------NOX------- ZERO (0-1000 ppm)	SPAN	----------SO_2---------- ZERO (0-100 ppm)	SPAN	ZERO (0-1000 ppm)	SPAN	-----O_2----- ZERO (0-25%)	SPAN
1.	0	0.9	2	1(0)	0.1	1.1	0.2	0.2
2.	0	1.0	2	1(1)	0.1	1.0	0.2	0.2
3.	0	0.8	0	1(1)	0.1	0.1	0.2	0.2
4.	0	0.5	0	0(1)	0.2	0.3	0.2	0.2
5.	0	0.3	0	0(1)	0.2	0.7	0.1	0.2
6.	0	0.7	1	1(1)	0.6	0.2	0.2	0.2
7.	0	0.2	1	3(1)	0.4	0.7	0.2	0.2

( ) = The values in parantheses are the second set of cal drift test runs.

Calibration Drift Limits: NOx & $SO_2 \leq 2.5\%$ of the span value, $O_2 < 0.5\%$ of the reference value of the gas.

NOTE: THE BOILER WAS ON LINE AND OPERATING ABOVE 50% OF NORMAL LOAD FOR THIS SERIES OF DRIFT TESTS.

1. The test period for the first test series is April 7-13, 1987.

2. The test period for the second test series is April 14-20, 1987.